

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims

1. (currently amended): A manipulator for servicing tubes extending through a tube sheet, comprising:

(a) a base member having a holder for holding tooling or an inspection device, the base member also having at least one gripper for releaseably gripping a tube extending through the tube sheet;

(b) a block member directly, rotatably connected to the base member so that the base member can rotate in a plane relative to the block member when a position of the block member is fixed and a position of the base member is not fixed and the block member can rotate relative to the base member when the position of the base member is fixed and the position of the block member is not fixed, at least a portion of the block member moveable, relative to the base member, in a linear direction in a straight line in a plane perpendicular to the plane the base member rotates in, ~~said rotation and linear movement of the block member being relative to the base member~~;

(c) a foot member directly connected to the block member for linear movement relative thereto, the foot member having at least one gripper for releaseably gripping a tube extending through the tube sheet; ~~and~~

(d) wherein the block member moves in two directions of linear travel in a straight line in the horizontal and vertical directions between the foot member and the base member, while maintaining the foot member and the base member in parallel planes; and

(e) wherein at least one of the grippers on each of the base member and the foot member includes a gripper mechanism for forcing a gripping arm against an inside wall of the tube extending through the tube sheet when the gripper mechanism is

actuated and a withdrawal mechanism that when actuated exerts a force in a direction to pull at least one of either the base member or the foot member associated with the at least the one of the grippers, toward the tube sheet when engaged to the tube extending through the tube sheet, to positively bias the one of the base member or the foot member against the tube sheet, the withdrawal mechanism and the gripper mechanism being separately actuated.

2. canceled

3. canceled

4. canceled

5. (currently amended): The manipulator of Claim 4_1 including a standoff pin that cooperates with the at least one of the grippers exerting the force to draw said base member and/or said foot member in the direction of the tube sheet to maintain said base member and/or said foot member a predetermined fixed distance from the tube sheet.

6. (original): The manipulator of Claim 1 wherein the foot member and block member each have at least two spaced grippers.

7. (previously presented): The manipulator of Claim 1 wherein each of the grippers includes insertion fingers that are respectively insertable into a corresponding one of said tubes extending through the tube sheet and each of said grippers further includes a limit switch that functions to verify a pre-selected length of insertion of the insertion fingers into the corresponding tube.

8. (previously presented): A manipulator for servicing tubes extending through a tube sheet, comprising:

(a) a base member having a holder for holding tooling or an inspection device, the base member also having at least one gripper for releaseably gripping a tube extending through the tube sheet;

(b) a block member directly, rotatably connected to the base member so that the base member can rotate in a plane relative to the block member when a position of the block member is fixed and a position of the base member is not fixed and the block member can rotate relative to the base member when the position of the base member is fixed and the position of the block member is not fixed, at least a portion of the block member moveable in a linear direction in a straight line in a plane perpendicular to the plane the base member rotates in, said rotation and linear movement of the block member being relative to the base member;

(c) a foot member directly connected to the block member for linear movement relative thereto, the foot member having at least one gripper for releaseably gripping a tube extending through the tube sheet; and

(d) wherein each of the grippers includes insertion fingers that are insertable into a corresponding one of said tubes extending through the tube sheet wherein the insertion fingers are biased against an interior of the corresponding tube by an internal piston that forces ball bearings to move in a direction of movement of the piston, up a tapered raceway between the piston and the interior of the insertion fingers forcing the insertion fingers out against the interior of the corresponding tube.

9. (original): The manipulator of Claim 8 wherein the insertion fingers are spring biased in a gripping position when inserted a predetermined distance into said tubes to avoid the loss of gripping power if a motive power of the piston is lost.

10. (currently amended): The manipulator of Claim 1 wherein the manipulator is sized to permit more than one independently operated manipulator, of substantially the same design, to be suspended from an underside of the tube sheet in either an inlet or outlet section of a channel head of a steam generator and ~~the a~~ more than one manipulator being operable in parallel in the same section of the channel head of the steam generator at the same time.

11. (previously presented): The manipulator of Claim 1, herein designated as the first manipulator, suspended from the underside of a semicircular portion of a tube sheet in an inlet or outlet section of a hemispherical channel head of a steam generator including a second manipulator of substantially the same design, as the first manipulator, suspended from the same semicircular portion of the tube sheet wherein the first manipulator and the second manipulator are designed to be operable at the same time.

12. (previously presented): The manipulator of Claim 1 wherein the manipulator is as much as approximately thirty pounds.

13. (previously presented): The manipulator of Claim 12 wherein the manipulator supports a payload of as much as seventy pounds.

14. (original): The manipulator of Claim 1 including pneumatic and/or hydraulic drives in combination with a single motorized drive.